Aug. 28, 1956 D. S. CAMPBELL 2,760,651

DRAFT GEAR

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Fig-1

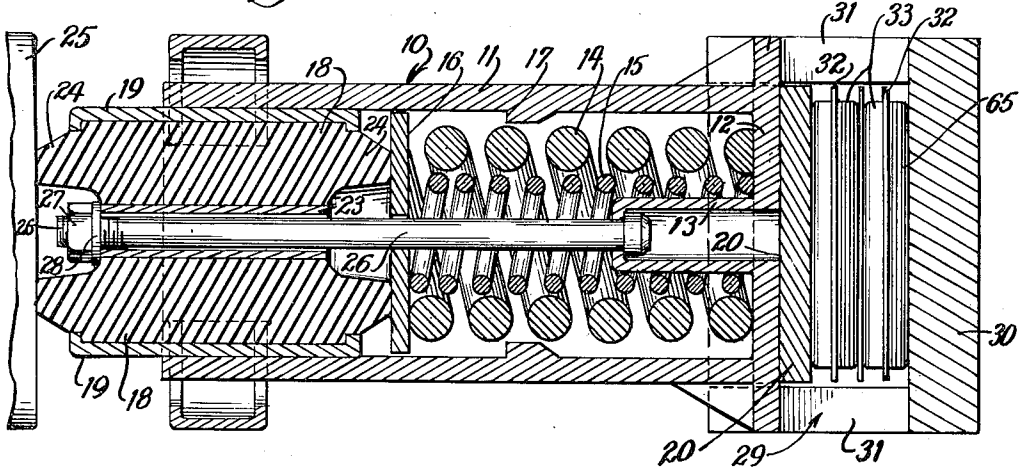


Fig-2

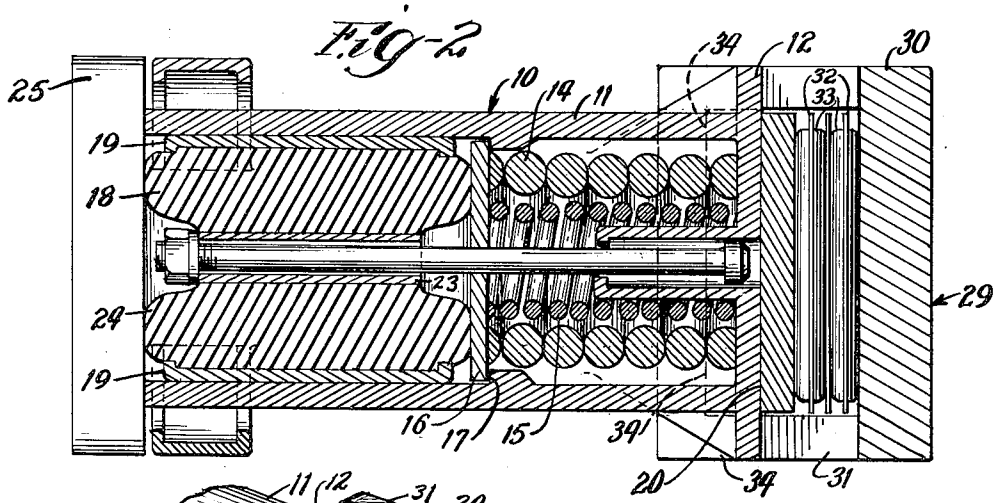
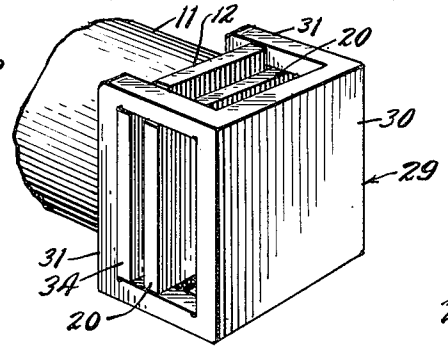


Fig-3



INVENTOR.
David S. Campbell
BY
Mason, Brown and Hansman
Attys.

Aug. 28, 1956 D. S. CAMPBELL 2,760,651

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Fig-4

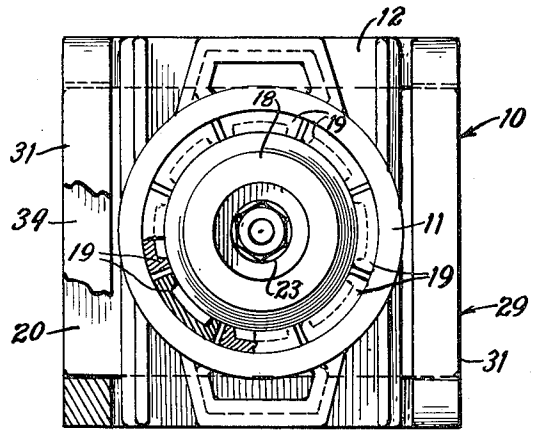
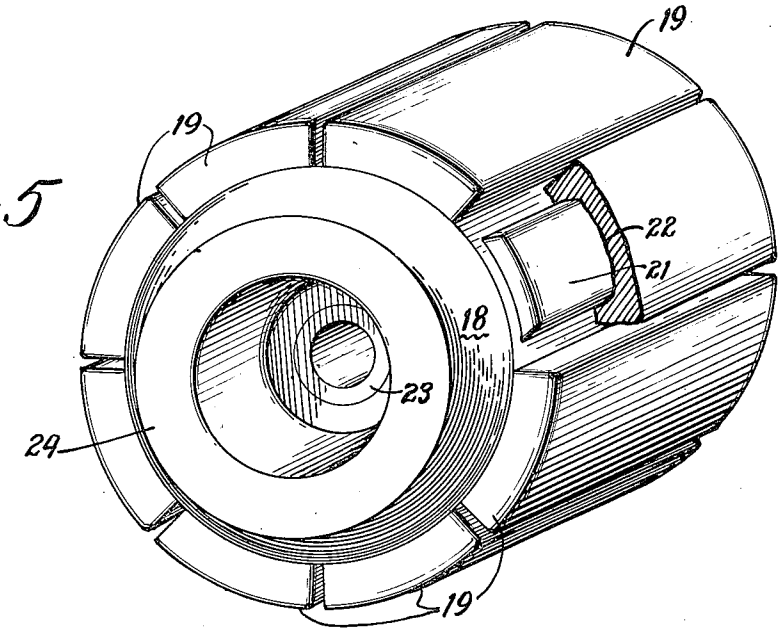


Fig-5



INVENTOR.
David S. Campbell
BY
Manny, Brown and Hansmann
attys.

Aug. 28, 1956 D. S. CAMPBELL 2,760,651

DRAFT GEAR

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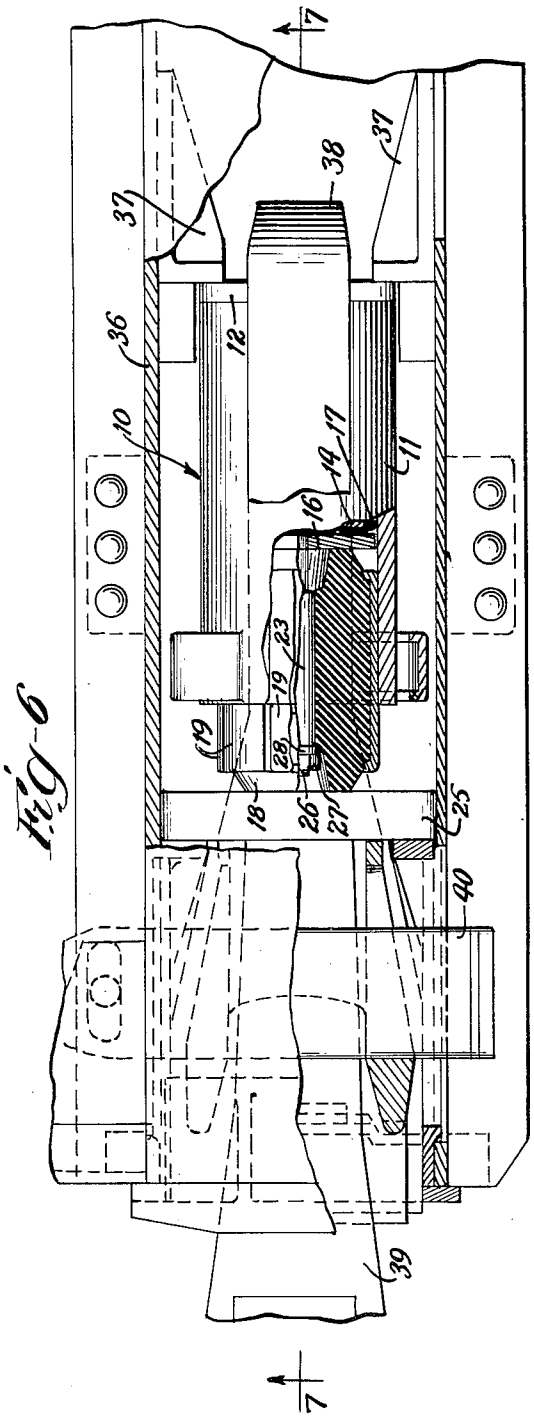


Fig. 6

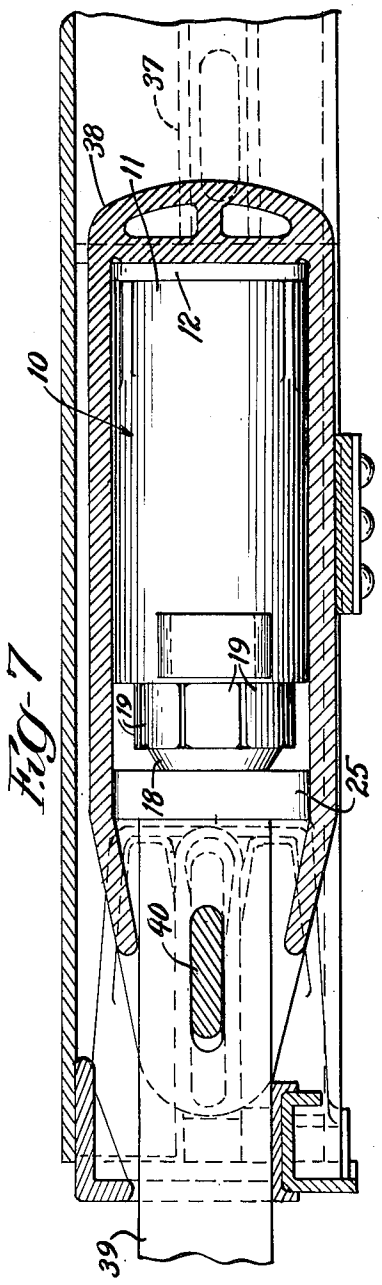


Fig. 7

INVENTOR.
David S. Campbell
BY
Mairy, Brown and Hausmann
Attys.

Aug. 28, 1956 D. S. CAMPBELL 2,760,651

DRAFT GEAR

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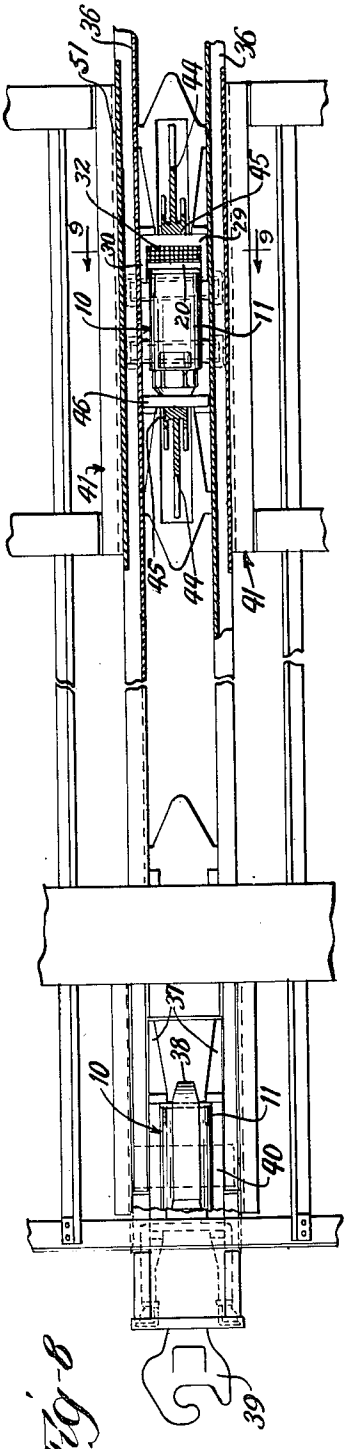


Fig-8

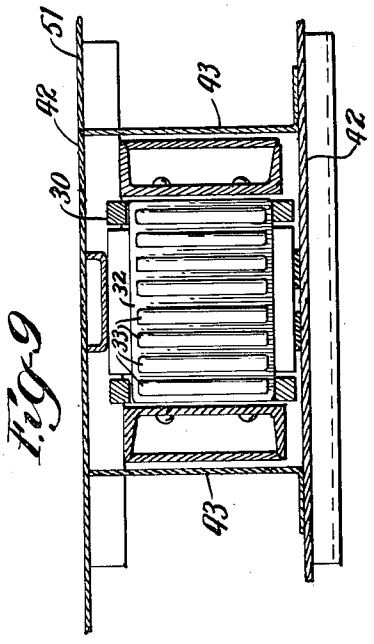


Fig-9

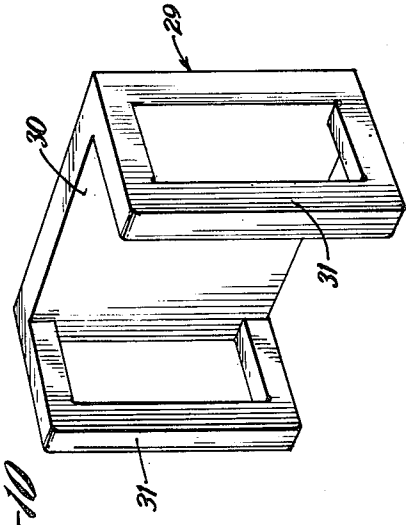


Fig-10

INVENTOR.
David S. Campbell
BY
Mann, Brownyard, Hansman & Attys.

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DRAFT GEAR

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Fig-11

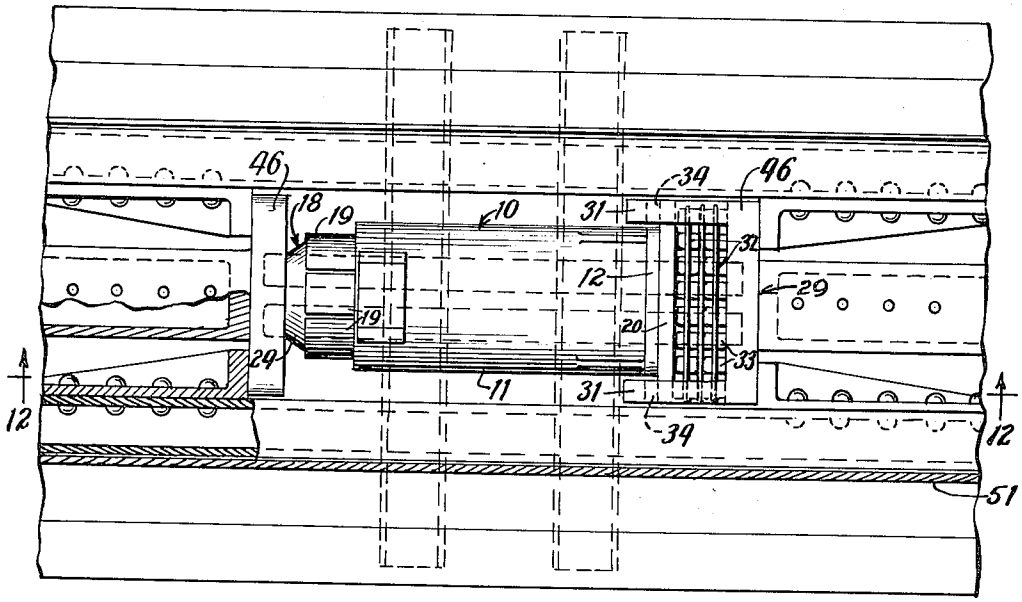


Fig-12

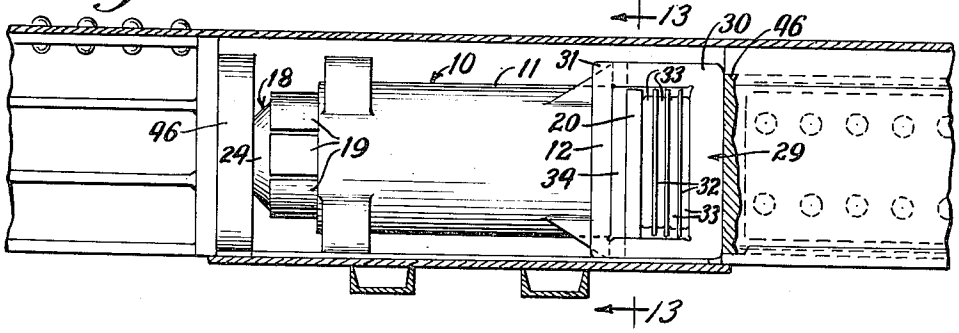
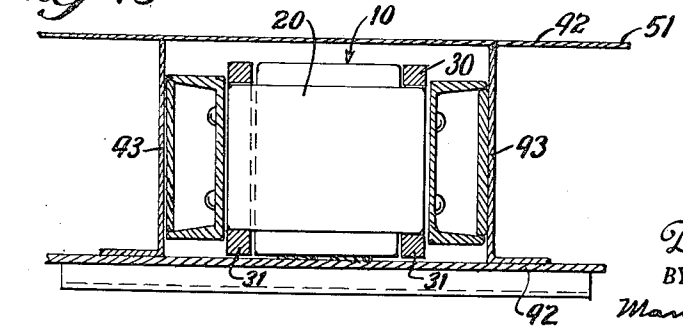


Fig-13



INVENTOR.
David S. Campbell
BY
Manny, Brown and Hausmann
Attys

United States Patent Office 2,760,651 Patented Aug. 28, 1956

2,760,651

DRAFT GEAR

David S. Campbell, Glen Ellyn, Ill., assignor to Cardwell Westinghouse Company, a corporation of Delaware

Application September 5, 1952, Serial No. 308,081

4 Claims. (Cl. 213—31)

This invention relates to draft gears for railway cars, and has for its principal object to provide a friction element in which friction shoes are applied through rubber that is subject to the force to be cushioned.

It is contemplated that the force will be applied lengthwise to the car, and the rubber will move the shoes laterally with respect to the center line of the car.

It is also contemplated that such a gear will serve as a main cushioning element in association with an auxiliary or emergency cushioning element to assist in absorbing the shocks, and in many cases to provide an emergency capacity for excessive shocks.

Further objects and advantages of the invention will appear as the disclosure proceeds and the description is read in connection with the accompanying drawings, in which:

Fig. 1 is a vertical section through a draft gear including main and auxiliary cushioning elements embodying the invention;

Fig. 2 is a similar view showing the gear compressed;

Fig. 3 is a perspective view showing the interrelation between the casings of the two cushioning elements under compression;

Fig. 4 is an end view looking from the left in Fig. 1, parts being broken away;

Fig. 5 is a perspective view of the main friction element;

Fig. 6 is a partial plan view and partial section showing the draft gear in a standard draft gear pocket associated with familiar elements including a vertical yoke;

Fig. 7 is a vertical section of Fig. 6 along the center line of the car, the cushioning elements being shown solid;

Fig. 8 is a partial plan and partial section showing the draft gear applied at one end of the car and also at the mid portion of the car between the car body and the center sill structure;

Fig. 9 is a cross-section on the line 9—9 of Fig. 8;

Fig. 10 is a perspective view of the frame or casing of the auxiliary cushioning unit;

Fig. 11 is an enlarged plan of the intermediate portion of the car showing the application of the gear between the body and the center sill structure;

Fig. 12 is a vertical section on the line 12—12 of Fig. 11; and

Fig. 13 is a cross-section on the line 13—13 of Fig. 12.

But these diagrammatic drawings and the corresponding description are used for the purpose of illustrative disclosure only, and are not intended to impose unnecessary limitations on the claims.

The main cushioning element or draft gear, generally indicated by **10**, includes a tubular casing **11** having a flanged head or follower **12** provided with a hollow boss **13**. Within the casing are spring elements **14** and **15** acting between the head **12** and the spring seat **16**, which latter comes to rest against a shoulder **17** in a casing **11** to limit the compression of the spring elements.

The main friction element includes a tube **18** of rubber and a series of friction shoes **19** surrounding it and cooperating with an inner wall of the casing **11** to provide the shock absorbing friction.

The tube **18** is provided with generally rectangular projections **21** which are received within recesses or pockets **22** in the shoes **19**, which are vulcanized to the rubber of the tube **18**.

The tube also receives a sleeve **23** vulcanized to it.

The tube is somewhat tapered toward the ends, and projects beyond the shoes and the sleeve **23**, as indicated at **24**, for contact with the spring seat **16** and a follower **25** in use.

When applied to a car, draft or buffing force tends to compress the tube **18** between the follower **25** and the spring seat **16** and the spring elements **14** and **15** between the spring seat **16** and the head **12**. In fact, those elements are slightly compressed when the gear is in released condition—to the end that there will be initial friction between the shoes **19** and the inner surface of the casing as the gear begins to close.

The greater the force, the greater the tendency to shorten the tube **18** and to expand it, thereby increasing the pressure of the shoes **19** against the inner wall of the casing and correspondingly increasing the friction. When the spring seat **16** comes against the shoulder **17**, no further compression is applied to the spring elements **14** and **15**, and the tube **18** with its friction shoes **19** continues to furnish shock absorbing capacity to the limit of the gear.

The initial compression is provided by a bolt **26** having its head in the hollow boss **13** and its threaded end provided with a nut **27** and a washer **28** adjusted against the outer end of the sleeve **23**.

The structure described may be used as a draft gear in a standard draft gear pocket, or varied to suit other conditions. In many instances, however, it is preferred to use it in association with an auxiliary cushioning element sometimes serving as an emergency to provide additional cushioning when the above described structure has fully closed.

The auxiliary cushioning unit **29** includes a frame or casing **30** having rectangular, open flanges **31** adapted to receive the inner end of the casing **11** with the flanged head **12** between the rectangular flanges **31**.

The cushioning elements of the auxiliary draft gear include plates **32** of relatively incompressible material (preferably steel, 3/16" S. A. E. 1010 is satisfactory) provided with rows of aligned openings, and rubber bars or mats **33** lying over the openings at each side of the plates **32** and connected by plugs through those openings, the bars being of a rubber composition of suitable durometer hardness—for example, 58 to 62.

Interposed between the resilient units is a spacing plate.

The details of construction of the auxiliary cushioning unit may be substantially as disclosed in the application of Herbert E. Tucker, Ser. No. 272,817, filed February 21, 1952.

The cushioning elements are compressed between the end of the frame **30** and the follower **20**, and held in pre-compressed condition by keys **34**, which are really rectangular bars corresponding to the thickness of the flanges **31** and inserted between those flanges and the follower **20**.

The capacity of the auxiliary or emergency cushioning unit may be made to suit conditions or preferences, and when it is used as an emergency it will have a capacity that will provide safety or emergency cushioning when the associated main draft gear has gone solid.

The main cushioning unit may be used as a draft gear in a standard pocket in association with familiar parts shown in Figs. 6 and 7, and of which **36** indicates the

center sills, **37** the draft lugs, **38** the vertical yoke, **39** the coupler, and **40** the key.

In a similar relation, the main auxiliary cushioning units may be used at the ends of the car and proportioned so as to fit within the standard draft gear pocket or in a special draft gear pocket.

For some uses, it is also desirable to provide cushioning between the center sill structure of the car and its body, in which case the draft gear arrangement such as shown in Figs. 6 and 7 may be supplemented, as shown in Figs. 8–13, by a draft gear assembly generally indicated by **41** between the center sills **36** and the boxlike frame generally indicated by **51** on the car body through which the center sill structure may move lengthwise in opposite directions subject to the cushioning of the draft gear. The frame **51** is here shown in Fig. 9 as including spaced upper and lower elements **42** and side elements **43**, and there are vertical cross pieces **44** which include upright faces **45** adapted to cooperate with followers **46** at opposite ends of the draft gear.

The draft gears at the end of the car may be designed to give the standard travel of 2¾″ to 2⅝″, whereas the draft gear in the middle of the car may be designed to give up to 7″ of travel between the car body and the center frame structure connected with the couplers to form what may be called a train line.

An outstanding and desirable characteristic of the main cushioning element is that the rubber tube **18**, in addition to its resilience in absorbing shock and prompting release, acts as a fluid in transmitting pressure uniformly to the friction shoes **19**. It appears to be a fluent vehicle for receiving, transmitting, and distributing the force of the buffing and draft shocks.

Friction may be relied upon for at least 85% of the energy absorption in buff and draft, and to control rebound during release.

The main cushioning element may well be designed to take normal buffing shocks and the auxiliary cushioning element designed to provide emergency absorption for fast switching shocks.

Metal parts are satisfactory in steel. The housing and friction shoes are preferably heat treated.

For some applications, the main cushioning element may be replaced by a friction draft gear such as Cardwell Westinghouse (Car Builders' Cyclopedia, 1946, p. 942; Cardwell Patent No. 2,496,442, February 7, 1950), and used with the auxiliary high capacity cushioning unit.

I claim:

1. In a draft gear for railway cars, a hollow casing, a spring in the casing, a spring seat against the spring and a friction element against the spring seat including a rubber tube, a sleeve within the tube, and friction shoes around the tube in contact with the casing said tube pressing against substantially the entire inner surface of said friction shoes and projecting beyond the ends of the sleeve and shoes so that a compressive force applied to a projecting end of said tube will substantially simultaneously tend to cause the body thereof to expand outwardly and urge said friction shoes into tighter engagement with the wall of said casing.

2. In a draft gear for railway cars, a hollow casing, a spring in the casing, a spring seat against the spring and a friction element against the spring seat including a rubber tube, a sleeve within the tube, friction shoes around the tube in contact with the casing said tube pressing against substantially the entire inner surface of said friction shoes and projecting beyond the ends of the sleeve and shoes so that a compressive force applied to a projecting end of said tube will substantially simultaneously tend to cause the body thereof to expand outwardly and urge said friction shoes into tighter engagement with the wall of said casing, and an auxiliary cushioning element against which the casing acts.

3. In a device of the class described, a hollow casing having a movable spring seat therein, a spring in the casing on one side of the movable seat and having one end seated thereagainst, fixed means for seating the opposite end of the spring, a rubber tube in the casing on the side of the movable seat opposite said spring, friction shoes secured around the outside of said tube and frictionally engaging the inner wall of the casing, one end of said tube engaging said movable seat and the opposite end thereof projecting from the end of the casing, whereby a compression force applied to the projecting end of said tube will tend to cause the body thereof to expand outwardly and urge said friction shoes into tighter engagement with the wall of said casing.

4. A device of the character set forth in claim 3 including a sleeve secured in said tube, and means passing through said sleeve for securing said tube, seat and spring in assembled relation in said casing.

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